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Enforcement of the Danish Bisphenol A restriction on Food Contact Materials and Articles for infants

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Introduction In Denmark a national restriction was implemented in 2010 banning the use of bisphenol A (BPA) in any Food Contact Materials intended for children in the age 0-3 years. The ban includes BPA in baby bottles, baby cups, food cans for infant formulas and lids for glass containers with baby food. To enforce this regulation samples needed to be analysed using a stepwise test procedure to ensure that BPA was neither used as a starting substance in a polymer nor as an additive.

Materials and methods

In 2010 59 samples of FCM's for infants were tested for compliance with the Danish regulation by Fourier Transform Infrared Spectrometry (FTIR).
In 2011 30 samples (consisting of a total of 85 subsamples) were analysed for the presence of BPA by a stepwise test procedure as given below.

1)Screening of samples by FTIR (2010-11): All samples (including different parts of the samples) were analysed by FTIR for indication of the presence of BPA in the samples and for polymer materials with reacted BPA. Based on the screening results the samples were either concluded or they were analysed further in a second step:

2) Identification and quantification of residual BPA in the polymer by LC-MS/MS (only 2011): The samples, including subsamples, were dissolved in suitable solvents and the extracts were analysed for bisphenol A by LC-MS/MS (ES-).

Figure 2. Selection of samples analysed in the campaign of 2011.

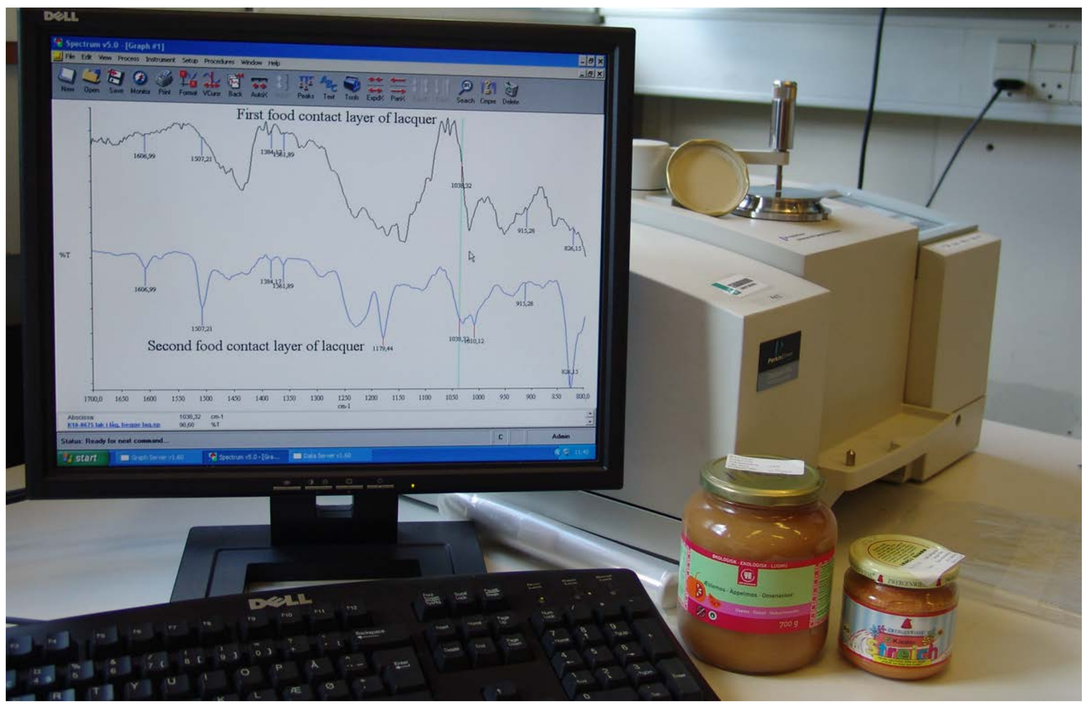

Figure 1. Recording ATR-FTIR–spectra of lids (2010 campaign) coated with two different types of lacquers

Table 1: Overview of results from the 2011-campaign

Samples	Polymer	Results	Conclusion based on
13 samples	PO	Compliant polymers	FTIR
Baby bottle	PC	Non compliant polymer	FTIR
Baby bottle	PP	LOD < BPA < LOQ	LC-MS/MS
Baby cup	ABS	LOD < BPA < LOQ	LC-MS/MS
Baby spoon	PP	LOD < BPA < LOQ	LC-MS/MS
Food Container	PP	LOD < BPA < LOQ	LC-MS/MS
13 samples	PO, PES, PPSU	BPA < LOD	LC-MS/MS

Results and discussion

One sample made of Polycarbonate (PC) was deemed non-compliant based on the FTIR analysis. 17 samples of different polymers were tested further by LC-MS/MS. In four of the samples BP A was identified at trace levels (>LOD of the method). However, all four samples were < LOQ and deemed compliant. The low levels of BPA may be due to contamination of the finished FCM from eg. labels and printing ink on the outer packaging.

The internet marketing of two food samples in glass jars (sold as infant food) was found not to be in compliance. The assessment of the lids was based on FTIR analysis of both sides of the inside lacquers (figure 1) showing that the "second food contact layer" of the lacquers contained BPA-based epoxy.

Ongoing enforcement work

In 2012 a follow up campaign with a main focus on BPA in lacquers of food cans and lids for glass jars intended for infant food has recently been started. The project is implemented for the Danish Veterinary and Food Administration. Due to the EU restriction and different national bans on BPA, alternative substances substituting BPA may be used. Therefore, the test strategy is extended and will include LC-MS/MS screening for bisphenol S and other potential substitutes for BPA.

Reference: Enforcement of the Danish Bisphenol A restriction on Food Contact Materials and Articles for infants, **2012, Gitte Alsing Pedersen, Annie Foverskov and Jens Højslev Petersen, in prep**